DOCUMENT RESUME

ED 042 532 RC 004 572

AUTHOR	Kagan, Spencer; Madsen, Millard C.
TITLE	Cooperation and Competition of Mexican, Mexican-American, and Anglo-American Children of Two Ages Under Four Instructional Sets.
INSTITUTION	California Univ., Los Angeles. Center for Head Start Evaluation and Research.
SPONS AGENCY	Office of Economic Opportunity, Washington, D.C.
PUB DATE	Jan 70
NOTE	21p.
EDRS PRICE	EDRS Price MF-$0.25 HC-$1.15
DESCRIPTORS	*Age Differences, *Anglo Americans, Behavioral Science Research, Behavior Patterns, Cross Cultural Studies, Cultural Differences, *Elementary School Students, Game Theory, *Mexican Americans, *Preschool Children, Research Methodology

ABSTRACT

The degree to which children of 2 age groups and different subcultures differ in the amount of cooperative and competitive behavior they exhibit is explored. A game measuring cooperation and competition was played with pairs of Anglo Americans and Mexican Americans who were 4-5 years of age and with Anglo Americans, Mexican Americans, and Mexicans who were 7-9 years old. Cooperative play allowed both pair members to receive rewards; competitive play was irrational, allowing no subject to reach his goal. The number of moves pairs took to reach a goal indicated that younger subjects were more cooperative than older subjects. Among the older children, Mexicans were most cooperative, Mexican Americans next, and Anglo Americans least cooperative. Also among the older children, instructional sets designed to create "I" orientation increased competition whereas sets stressing "we" orientation increased cooperation. Qualitative differences between patterns of play were noted for the cultural and age groups. Sex differences were not found. A list of references, footnotes, 2 tables, and 1 paradigm are also presented. (AL)

ED042532

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

COOPERATION AND COMPETITION OF MEXICAN, MEXICAN-AMERICAN, AND ANGLO-AMERICAN CHILDREN OF TWO AGES UNDER FOUR INSTRUCTIONAL SETS[1]

Spencer Kagan and Millard C. Madsen

University of California, Los Angeles

January 1970

RC004572

---

[1]This research was carried out with the support of the Head Start Research and Development Center at U.C.L.A., Dr. Carolyn Stern, Director. Office of Economic Opportunity Project No. 4117 and 9938.

Abstract

A game measuring cooperation and competition was played with pairs of 4-5 year old Anglo- and Mexican-American and with 7-9 year old Anglo-Americans, Mexican-Americans, and Mexicans. Cooperative play allowed both pair members to receive rewards; competitive play was irrational, allowing no subject to reach his goal. The number of moves pairs took to reach a goal indicated that 4-5 year olds were more cooperative than the older subjects ($p<.001$). Among the 7-9 year children, Mexicans were most cooperative, Mexican-Americans next most, and Anglo-Americans least cooperative ($p<.001$). Among the older children, instructional sets designed to create an "I" orientation increased competition, whereas sets stressing a "We" orientation increased cooperation ($p<.001$). Qualitative differences between patterns of play were noted for the cultural and age groups. Sex differences were not found.

Cooperation and Competition of Mexican, Mexican-American, and Anglo-American Children of Two Ages Under Four Instructional Sets[1]

Spencer Kagan and Millard C. Madsen[2]

University of California, Los Angeles

This paper represents an attempt to assess the degree to which children of two ages and in three subcultures differ in the amount of cooperative and competitive behavior they exhibit at a choice point at which both kinds of behavior are possible. A second purpose was to determine the extent to which cooperative or competitive behavior would be elicited by instructional sets, and the extent to which the effects of such sets interacted with age and subculture. A third purpose was the development of a simple, yet sensitive, technique by which the cooperative and competitive behavior of children can be assessed in different cultural settings.

That cultures differ in tendencies toward cooperative and competitive behavior is well documented by the anthropological observations of Mead (1961). More pertinent to the present study is the observation by Romney & Romney (1963) of an almost total lack of competitiveness and aggression in a Mexican village. The low incidence of these types of behaviors was attributed to the threat of ostracism as well as to the use of ceremony, ritual, and superstition. Cultural control of competition and reinforcement of cooperation have also been described as characteristics of Mexicans living in the United States by William Madsen (1964).

That a strong tendency toward cooperation as opposed to competition

does not indicate a uniform national Mexican characteristic is clear from the results of Madsen (1967), who found Mexican urban middle class children to be much more competitive than Mexican village or urban poor children. In a second study, in which the same experimental techniques were used, Madsen & Shapira (in press) found Mexican children from a small town to be far less competitive than Afro-American, Anglo-American, and Mexican-American children. Mexican-American boys were significantly less competitive than Afro-American or Anglo-American boys, while the differences among the girls of these three cultural groups did not reach significance.

On the basis of the previous research, it was expected that children from a small Mexican town would be less competitive than Anglo-American children, with the Mexican-American children performing somewhere between the other two groups. Previous studies, however, included no age or experimental variables which provided information about the age at which cooperative or competitive tendencies develop in the different subcultures or the conditions of preparatory set that would elicit such behaviors.

Previous research (Madsen, 1967; Nelson & Madsen, 1969; Shapira & Madsen, 1969; Madsen & Shapira, in press) indicates clearly that cooperative behavior can be elicited quite easily among children of all subcultures studied, under conditions of group reward. When children are switched to individual reward, however, children of some subcultures (Kibbutz, Mexican village) continued to cooperate while children of other subcultures (urban Afro- and Anglo-American, urban Israeli, and urban Mexican) began to compete in a non-adaptive manner.

In the present study an individual reward contingency was used in all conditions; only instructional set was manipulated. It was

hypothesized that instructional sets leading subjects to see themselves either as a group or as individuals influence the degree of cooperative or competitive performance. To test this hypothesis, verbal sets which emphasized a group or individual orientation were compared with a verbal neutral condition which emphasized neither group nor individual. A fourth condition was included in an attempt to assess the effects of pre-experiment practice that stressed individuality.

Method

Subjects

128 Anglo-American, 128 Mexican-American, and 64 Mexican children participated in the experiment. The Anglo-American and Mexican-American groups each included 64 subjects of age 4-5 and 64 subjects of age 7-9 years. The Mexican group included only 7-9 year olds. All subcultural and age groups were equally divided by sex.

The Anglo- and Mexican-American subjects were enrolled in daycare centers, pre-schools, and elementary schools in the city of Los Angeles, California. Both groups came from lower economic status areas and each group represented the ethnic majority in its respective area.

The Mexican children were residents of Nuevo San Vicente, a small town (pop. 800) located 54 miles south of Ensenada, Baja California. Most of the homes of Nuevo San Vicente are of adobe or concrete block, usually built by their residents. Some homes enjoy piped-in water and part time electricity, but dirt floors are common and indoor bathrooms are practically unknown. Few homes have more than 4 rooms; families are large; children sleep many to a room. The Mexican subjects were tested in the 7 room school which has a director and 9 teachers. The students attend half-day; younger children come in the morning, older children in the afternoon. Nuevo San Vicente has a few small retail business

establishments, but the economy is essentially agricultural.

Apparatus and Procedure

The experimental apparatus[3] consisted of a board on which were 7 rows of circles, seven circles to a row (Figure 1). Circles were 1 inch in

- - - - - - - - -
Insert Figure 1
- - - - - - - - -

diameter and were connected by 1 inch lines. By informing pairs of children that they would take turns moving a marker to adjacent circles and that receiving a toy was contingent upon the marker moving to a different circle for each subject, it was possible to measure cooperative and competive responses. It was impossible for both subjects of a pair to receive a toy on the same trial, but possible for subjects to share toys over trials by helping each other within trials. In this situation, given a limited number of moves, competition is nonadaptive in that it allows neither subject to reach his goal.

Each pair of subjects was seated on chairs facing each other with the circle matrix board on a table between them. The marker was initially placed in the center of the board (D4) and subjects were told that it could be moved to another circle by following the lines, but that it could move only one circle at a time. Each pair played 4 times, each trial terminating after a goal was reached or when all 20 alloted moves were made.

Pairs were given pre-game practice in which subjects alternated moving the marker a total of 6 moves each. The combination of pre-game practice and verbal description of the game contingencies differed for each of the four conditions. Four girl pairs and 4 boy pairs of each age and subculture received one of the following 4 treatments which varied in the degree to which group as opposed to individual orientation was

stressed.

Neutral Condition. The verbal description of the game in the neutral condition stressed neither group nor individual orientation, attempting rather a neutral presentation of the situation which would allow children to structure their play either cooperatively or competitively. During pre-game practice, subjects took turns moving the marker to 4 goals not in the direction of actual trial goals. The experimenter indicated the direction of moves by stating "the marker wants to move here." After the pre-game practice, subjects were instructed as follows that they would play a game for toys:

> "There are four toys, and the game will be played four times. First the game will be played for the drum (experimenter points to the first toy). If the marker moves here (experimenter points to G4), (Subject 1) will receive the drum; if it moves to this circle (Subject 2) will get to keep the drum."

The experimenter further explained that each time a move was made, one of twenty plastic chips would be taken away and that if all moves were used up before the marker reached either circle, no one would receive the toy.

After both children indicated their understanding, play was begun. If the marker reached a goal circle, experimenter announced "The marker moved here (experimenter points), so ___(name)___ will receive the toy." If subjects did not reach a goal after 14 moves, the experimenter stopped play and drew attention to the remaining move indicators, stating there were only six moves left and restating the reward contingencies.

If subjects did not reach a goal in the twenty alloted moves, the experimenter stated, "All the moves are used up. Because the marker did not move here or here (experimenter indicates goal circles), this

toy will be taken away, no one will have it." The experimenter then placed the toy out of sight. After the first trial, play was repeated for the three remaining toys. Children alternated moving first.

I Set Condition. The only difference between the I set and Neutral conditions were the following changes of wording in the I set designed to stress individuality and possessiveness. During pre-game practice the experimenter did not refer to the marker as wanting to move, but rather said, "I want the marker to move..." When describing the individual reward situation, the experimenter did not refer to the goal circles as "here" but rather, speaking to subjects individually, said first to one then the other, "This circle (subject's name) will be your circle, if the marker moves to your circle you will receive the drum." When explaining what would happen if all the moves were used up before either child received the toy, in questioning the children after instructions, in warning the children if only six moves remained, and in announcing goals or failure to reach goals, the experimenter always referred to the goal circles as the subject's circle.

We Set Condition. The only difference between the We set and Neutral conditions were the following changes of wording in the We set designed to stress group orientation and deemphasize possessiveness. During pre-game practice the experimenter did not refer to the marker wanting to move, but rather said, "We want to move..." When describing the individual reward situation, the experimenter spoke to the children as a group and said, "If we move the marker to this circle, we can give the drum to (subject 1 name); if we move it to this circle, we can give the drum to (subject 2 name). In all aspects of instruction the experimenter stressed "We" and did not refer to the goals in a possessive sense.

I/We Treatment. To assess the effects of a pre-game practice which

stressed individuality, the I/We treatment was designed. In the pre-game practice of the Neutral, I, and We set conditions, subjects moved toward goals indicated by the experimenter. In the I/We Treatment no goals were indicated for the pair, instead, each subject took turns moving the marker wherever he pleased. Rather than instructing subjects "We would like to move over here" to direct them toward prescribed goals as in the We condition, the experimenter spoke to each child individually in the I/We treatment, saying, "We can move wherever we want." In total number of practice moves per subject (6), and in all other aspects of instruction, the I/We treatment was identical to the We set condition.

Results

Data were analyzed in three ways: number of moves, number of prizes won, and types of moves. The number of moves made and the number of prizes obtained (number of trials with less than 20 moves) indicated similar differences in all comparisons. Of the two analyses, statistical analysis only of the number of moves is presented because it is the more sensitive measure. While the number of moves clearly indicates the presence or absence of cooperation, it does not indicate the nature of competition observed. The qualitative differences in play are indicated by categorization of the types of moves made.

Number of moves.

The mean number of moves per pair and the number of prizes won per pair in each culture by age group under each condition is presented in Table 1.

- - - - - - - - - - - - - -
Insert Table 1 about here
- - - - - - - - - - - - - -

For the number of moves (and for the number of prizes earned), two separate factorial analyses were necessary because Mexican subjects of

age 4-5 were not included in the study. The first analysis reported is for Anglo- and Mexican-American subjects of both age groups; the second analysis is for ages 7-9 of all three cultural groups. All comparisons between individual means were performed by the Newman Keuls procedure.

The 2x2x2x4x4 (culture x age x sex x treatment x trial) analysis of variance of the number of moves per pair indicated significant effects due to age ($F\ 1/99 = 136.7$, $p < .001$) and treatments ($F\ 3/99 = 2.98$, $p < .05$). The effect due to culture approached but did not reach the .05 level of significance. There were two significant interactions: age x treatment ($F\ 3/99 = 2.85$, $p < .05$) and age x trial ($F\ 3/294 = 3.67$, $p < .05$). The age x treatment interaction is apparent by inspection of Table 1: treatment means differ significantly from each other for the older but not younger group. The age x trial interaction is such that younger subjects averaged more moves on trial 1 than on subsequent trials while the older subjects averaged fewer moves on trial 1 than on subsequent trials. None of the other main effects or interactions approached significance.

The 2x3x4x4 (sex x culture x treatment x trials) analysis of variance of moves per pair revealed significant main effects due to culture ($F\ 2/72 = 22.37$, $p < .001$), treatments ($F\ 3/72 = 6.13$, $p < .001$), and trials ($F\ 3/216 - 3.05$, $p < .05$). No significant effects due to sex and no significant interactions were indicated. Comparisons of culture means indicated that each culture differed from the other two beyond the $p < .01$ significance level. Comparisons of treatment means indicated that significantly more moves were made under the I set than under the neutral condition ($p < .01$) and significantly fewer moves were made under the we set than under the neutral condition ($p < .05$). Subjects made more moves under the I/We treatment than under the We set condition ($p < .01$).

Types of moves.

The circle matrix board allows subjects to assist each other cooperatively in moving directly to a goal in as few as three moves. Any number of moves greater than three may result from direct competition (each subject always moving the marker directly toward his own goal) or from patterns of moves in which subjects neither cooperate nor directly compete, avoiding both alternatives by moving sideways. Of the vast number of possible patterns of moves pairs can make, six mutually exclusive and exhaustive categories indicate the distinct patterns most frequently made. The major differences between groups are clear from the percentage of trials that fell into each category as indicated in Table 2.

- - - - - - - - - - - - - -
Insert Table 2 about here
- - - - - - - - - - - - - -

The number of pairs contributing to each percentage figure by at least one trial in a category is indicated to show that trials and subjects were not confounded to any marked extent. The six category definitions follow.

Complete cooperation. A trial was labeled complete cooperation if a goal was reached in three moves. For instance, assuming subject 1 leads off towards his goal (G4) by moving from the center (D4) to E4, then complete cooperation proceeds in turn to F4 and to goal G4. As indicated in Table 1, complete cooperation characterized approximately three-fourths of all trials made by both 4-5 year old groups. For the 7-9 year olds, however, the results are quite different: 63% of Mexican, 29% of Mexican-American, and only 10% of Anglo-American trials were completely cooperative.

Complete competition. If after an initial move toward a goal, subjects took the remaining 19 turns moving the marker back into the circle from

which their partner had moved, the trial was called complete competition. If, for example, subject 1 leads off toward his goal by moving to E4, a complete competition trial would proceed E4-D4-E4-D4- for 20 moves with no subject reaching his goal. The younger children were almost never completely competitive. Among the older children there was a slightly greater number of complete competition trials by the Anglo-Americans (14%) than by the Mexican-Americans (6%) and Mexicans (7%).

Submission. Trials were categorized as submission if, after the first subject led off toward his goal and the second subject made a direct conflict move, subject 1 then submitted, moving toward subject 2's goal so that the pair took a total of 5 moves to reach subjects 2's goal. The submission pattern accounted for only a small percentage of trials and did not differentiate the groups except for a slight trend for submission to more characteristic of the younger subjects.

Staircasing. A distinctive initial pattern of avoidance of direct conflict on the first four moves distinguished what were called staircasing trials. On these trials the first subject moved toward his goal; the second subject then moved neither to help nor in direct conflict, but sideways; the first child then again moved toward his goal; and the second child again moved sideways. The result is a pattern of moves resembling a staircase. This pattern was characteristic of the two Mexican cultural groups, occurring most frequently in the older Mexican-Americans.

Non-conflict. Trials in which neither complete cooperation nor staircasing occured were called non-conflict if subjects never moved the marker back into the circle from which the other subject had just moved. Non-conflict trials were considerably more frequent among the Mexican and younger subjects.

Partial conflict. Trials containing from one to eighteen conflict moves without displaying a submission or staircasing pattern were named partial conflict. A large percentage of trials by 7-9 year Anglo-Americans (73%) and Mexican-Americans (50%) fell into this category; in comparison, the younger and Mexican children seldom made conflict moves.

Discussion

This experiment was not designed to determine why subcultures differ in cooperative-competitive tendencies, but to find out whether, and to what extent, such differences exist. The results in terms of a developmental-descriptive study, however, are quite clear.

The age differences among the Anglo- and Mexican-American groups are particularly striking; at first glance they give the impression that the younger children are more rational in solving the problem, and thereby obtaining rewards, than are the older children. If one is to hold that a rational morality of cooperation (Piaget, 1932) develops concurrently with the child's intellectual development, the present age-related results lead to a very pessimistic estimate of intellectual growth. One more likely explanation is that the high degree of cooperation among the 4-5 year subjects is due not to a rational morality of cooperation, but rather to what Piaget referred to as a morality of constraint (heteronomy) based on external authority.

A second possible reason for the younger rather than older children to behave more rationally in terms of their own goals could be a relative absence in young children of a strong own-goal orientation; the younger children may fail to completely distinguish their own from the other child's goal so that a goal for one is seen as a goal for both. The pre-school children may have a poorly differentaited 'I' or a strong 'We' orientation which is not overcome by any of the instructional sets.

Thus, either because of a morality of constraint or a failure to distinguish own from other goals, young children may behave rationally in the experiment for non-rational reasons.

The tendency of the 7-9 year Anglo- and Mexican-Americans to engage in irrational competitive strategies may indicate that, at least in some subcultures, a morality of restraint is not automatically supplanted by a morality of autonomous cooperation as the child develops intellectually. This is not to deny that the intellectual capacity for rational cooperation is not present to a greater extent in the 7-9 than 4-5 year olds. Rather, it is to assert that the environmental milieu in which United States children develop during the early school years, given the high value placed on individual achievement through competition, may lead to a strong 'I' orientation by age seven which masks any potential for behaving on the basis of an autonomous morality of cooperation.

Verbal comments provide evidence that competitive pairs did not see the cooperative solution. While playing, competitive subjects spontaneously declared "This game is too hard," or "No one can win." When asked after the experiment how they might have gotten some toys, competitive subjects most often responded, "If I could play alone," or "If I could move more than once (Not take turns moving)." That the children strongly wanted the toys they lost by their competitive strategy is indicated by their pleading with their partner to let them get a toy and their expressions of disappointment and anger upon failing to receive any.

The cultural differences among the 7-9 year groups lead to the inference that different cooperation-competition orientations are learned in the different cultural settings. In every condition the Mexicans were the most cooperative and the Anglo-Americans the least cooperative. The Mexican-Americans, in all conditions fell between the other two groups in

degree of cooperation. That the Mexican American 7-9 year olds are indeed caught between two cultural orientations is indicated most dramatically by their relatively high incidence of what we have called staircasing. By staircasing, Mexican-Americans do not cooperate as completely as the Mexicans, but do not compete as vigorously as the Anglo-Americans. Mexican-Americans are like the Anglo-Americans in refusing complete cooperation, but like the Mexicans in avoiding competition.

The significant effects of instructional set indicate that the degree to which 7-9 year subjects structure the situation competitively or cooperatively is easily manipulated by instructions designed to create either an 'I' or 'We' orientation. That there was no significant interaction between set and culture indicates that cultural differences are quite robust, occurring under four conditons of set. The absence of set effects for the 4-5 year subjects may mean either that pre-school children are not sensitive to these rather subtle set differences or that their almost complete cooperativeness masked any sensitivity that may have existed.

Despite the absence of a significant overall interaction between set and culture, reference to Table 1 indicates some interesting trends for the 7-9 groups. The purpose of the neutral set was to provide a condition under which subjects would be left relatively free to structure the situation in harmony with their cultural background. When the results under the neutral condition are compared, Mexican and Mexican-American subjects do not differ significantly in the mean number of moves per trial. Both groups, however, made significantly fewer moves than the Anglo-Americans ($p < .01$). Anglo-Americans performed under the neutral set much as they did under the I set. Mexican and Mexican-Americans, in contrast, structured the neutral set situation more like they structured

the We set.

Results of the I/We Treatment indicate that behavioral as well as verbal sets influence cooperation-competition for the older children. The essential difference between the We and I/We conditions is that during pre-game practice subjects moved to prescribed goals in the We set whereas subjects moved wherever they wanted in the pre-game practice of the I/We treatment. That 7-9 age subjects were significantly less cooperative under the I/We than the We condition indicates that practice designed to make subjects see themselves as individuals rather than as a group as well as verbal set increases competition.

In sum, the results demonstrate clear age, cultural, and instructional set effects on the degree to which children cooperate or compete. The experimenters did not attend to the cultural antecedents of the behavior observed, but the degree to which irrational competition appears to develop with age in Anglo-American and to a lesser extent Mexican-American children leads to the hypothesis that in the developmental milieu in the United States, competition is rewarded to such an extent that United States children generalize a competitive strategy to situations in which it is non-adaptive.

References

Madsen, M. Cooperative and competitive motivation of children in three Mexican sub-cultures. Psychological Reports, 1967, 20, 1307-1320.

Madsen, M.C., & Shapira, A. Cooperative and competitive behavior of urban Afro-American, Anglo-American, Mexican-American, and Mexican village children. Developmental Psychology, 1970, 2, (in press).

Madsen, W. The Mexican-Americans of South Texas. Holt, Rinehart & Winston, 1964.

Mead, M. Cooperation and competition among primitive peoples. Beacon, 1961.

Nelson, L., & Madsen, M. Cooperation and competition in four-year-olds as a function of reward contingency and subculture. Developmental Psychology, 1969, 1, 340-344.

Piaget, J. The moral judgement of the child. Free Press, 1965, (Originally published, 1932.)

Romney, K., & Romney, R. The Mixtecans of Juxtlahuaca, Mexico. In B. Whiting (Ed.), Six Cultures, Wiley, 1963, Pp. 541-691.

Shapira, A., & Madsen, M. Cooperative and competitive behavior of kibbutz and urban children in Israel. Child Development, 1969, 40, 609-617.

Footnotes

1. This research was carried out with the support of the Head Start Research and Development Center at U.C.L.A., Dr. Carolyn Stern, Director. The authors are grateful to Pam Anderson for her assistance in collecting and recording data.
2. Requests for reprints should be sent to the authors, Department of Psychology, University of California, Los Angeles, California 90024.
3. The circle matrix board was developed and pilot work was carried out by the first author.

Table 1

Mean Moves Per Pair and Prizes Earned

Age	Culture	Condition							
		I		Neutral		We		I/We	
		Moves	Prizes	Moves	Prizes	Moves	Prizes	Moves	Prizes
4-5	Anglo-American	5.0	3.7	5.8	3.5	4.6	3.9	4.2	4.0
	Mexican-American	4.1	4.0	4.1	3.9	4.5	3.9	7.3	3.4
7-9	Anglo-American	18.8	.50	17.1	1.5	12.8	2.4	15.4	1.6
	Mexican-American	17.3	.87	9.1	3.0	10.8	2.6	15.3	1.8
	Mexican	10.1	2.6	5.6	3.5	3.0	4.0	8.5	3.5

Table 2

Percentage of Types of Moves and Number

of Pairs Falling at Least Once in Each Category

Age	Culture	Types of Moves											
		All Cooperation		All Competition		Submission		Staircasing		No Conflict		Partial Conflict	
		%	N	%	N	%	N	%	N	%	N	%	N
4-5	Anglo-American	74	30	3	2	3	4	0	0	7	6	13	12
	Mexican-American	73	30	3	1	3	3	5	7	11	14	5	7
7-9	Anglo-American	10	6	14	8	0	0	2	2	1	1	73	29
	Mexican-American	29	13	6	3	2	2	10	8	3	2	50	25
	Mexican	63	24	7	4	1	1	5	5	12	8	12	9

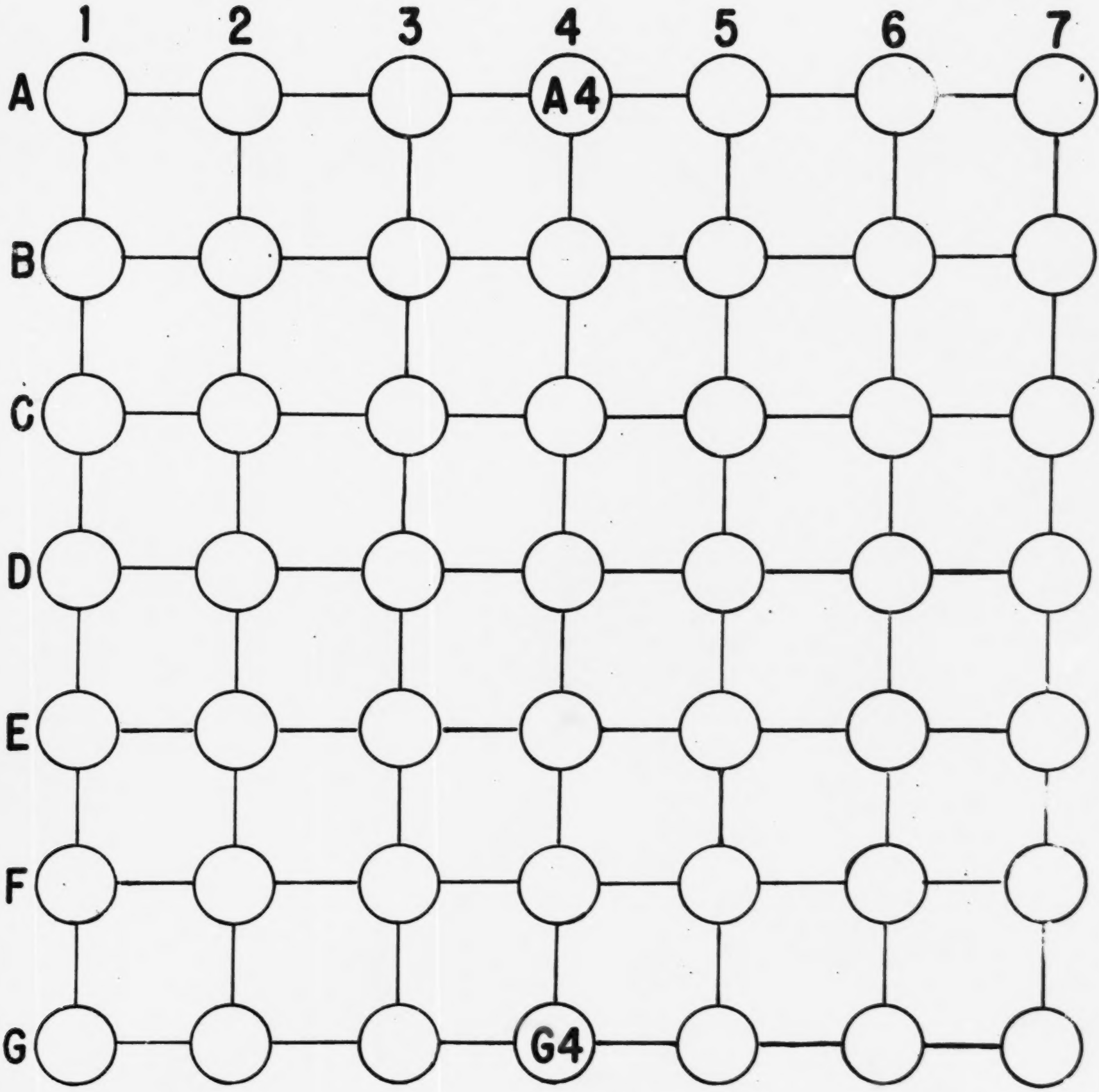

Figure 1. Circle matrix board. The column and row designations did not appear on the original board but are added to the figure for conveneint reference.